Model Optimization and Tuning Phase Report

Date	15 July 2024
Team ID	739827
Project Title	Thyroid disease classification using machine learning
Maximum Marks	10 Marks

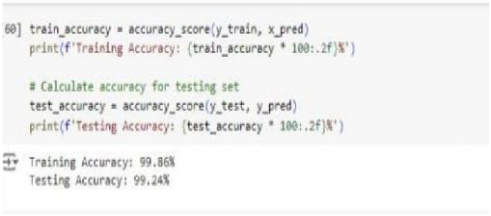
Model Optimization and Tuning Phase

The model optimization and tuning phase in thyroid classification using Machine Learning, adjustments are made to the model parameters to improve its performance in accurately predicting thyroid-related issues.

Model	Optimized Metric
	Evaluating the model using metrics

	Classification report

Hyperparameter Tuning Documentation(6Marks):

Model	Tuned Hyperparameters	Optimal Values
Random forest classifier	**Building the machine learning model** **Random forest classifier** 	**Testing the model** 

```
rf = RandomForestClassifier(random_state=42, bootstrap=False, max_depth=None,
                            max_features='sqrt', min_samples_leaf=2,
                            min_samples_split=2, n_estimators=100)
rf.fit(x_train,y_train)
```

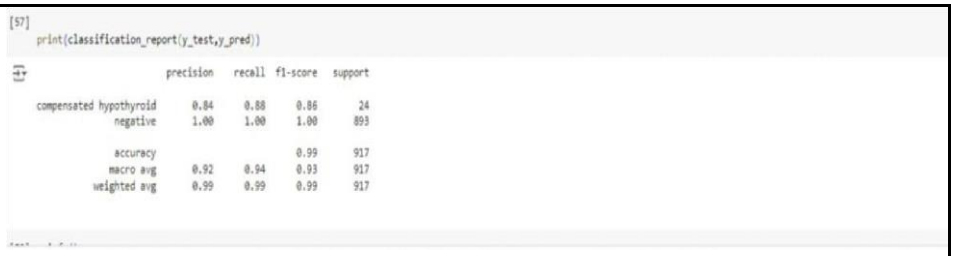
```
RandomForestClassifier(bootstrap=False, min_samples_leaf=2, random_state=42)
```

```
train_accuracy = accuracy_score(y_train, x_pred)
print(f'Training Accuracy: {train_accuracy * 100:.2f}%')

# Calculate accuracy for testing set
test_accuracy = accuracy_score(y_test, y_pred)
print(f'Testing Accuracy: {test_accuracy * 100:.2f}%')
```

```
Training Accuracy: 99.86%
Testing Accuracy: 99.24%
```

Performance Metrics Comparison Report (2 Marks):

Random forest classifier	

```
print(classification_report(y_test,y_pred))
```

	precision	recall	f1-score	support
compensated hypothyroid	0.84	0.88	0.86	24
negative	1.00	1.00	1.00	893
accuracy			0.99	917
macro avg	0.92	0.94	0.93	917
weighted avg	0.99	0.99	0.99	917

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Random forest classifier	A Random Forest Classifier for thyroid classification using Machine Learning is a model that can predict whether a person has thyroidrelated issues based on various input features by using a collection of decision trees.